United States Patent and Trademark Office

Examiner: Boes, T. Art Unit: 3656 Docket No. 3693

In re:

Applicant: SCHWENDEMANN, F.

Serial No.: 10/581,067

Filed: May 31, 2006

APPEAL BRIEF

August 8, 2010

Hon. Commissioner of
Patents and Trademarks
Washington, D.C. 20231

Sirs:

The Appellant submits the following for his brief on appeal and respectfully request consideration of same. The Appellant requests withdrawal of the rejections made and that the Application be placed in line for Allowance.

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I. REAL PARTY IN INTEREST

The real party in interest in the instant application is the assignee of the application, Robert Bosch GmbH, Stuttgart, Germany.

II. RELATED APPEALS AND INTERFERENCES

The Appellant is unaware of any related appeals or interferences with regard to the application.

III. STATUS OF CLAIMS

Claims 1-2 and 4-13 are rejected. Claim 3 was canceled. Claims 1-2 and 4-13 are appealed.

IV. STATUS OF AMENDMENTS

A Final Office Action finally rejecting claims 1-2 and 4-13 was mailed on March 15, 2010. A Request for Reconsideration was submitted on January May 20, 2010, in which claims 1 and 11 were amended. An Advisory Action was mailed June 3, 2010, in which the rejection of claims 1-2 and 4-13 was maintained. The Request for Reconsideration was entered, including the amendments to the claims and the prior rejection under Section 112, second paragraph, was withdrawn.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Independent claim 1 defines a gear drive unit (10) for adjusting moving parts in a motor vehicle, comprising a rotor shaft (18), which is supported in a housing (16) and is braced axially on the housing (16) via at least one face end (50) (specification, page 4, lines 9-15, lines 22-24; Fig. 1). The gear drive unit further includes a separate toothed element (32) for transmitting torque to a gear component (38, 40) (page 4, lines 15-19; Fig. 1). The toothed element (32) has a worm gear (34) and is secured to the rotor shaft (18) (page 4, lines 15-22; Fig. 1). The toothed element (32) also has an axial bearing face (48), which rests on the at least one face end (50) of the rotor shaft (18), and further has an axial bracing face (60) (page 4, lines 26-34; Fig. 1). The toothed element is braced on an adjusting element (64) on the housing (16), the adjusting element (64) having a form lock (72) that is configured to be engaged from the inside of the adjusting element by a selected installation tool (page 4, lines 26-34; Fig. 1). The adjusting element (64) presses with a predeterminable pressing force against the axial bracing face (60) (page 4, line 32 through page 5, line 7; Fig. 1).

Independent claim 11 defines a gear drive unit (10) for adjusting moving parts in the motor vehicle, comprising a rotor shaft (18), which is supported in a housing (16) and is braced axially on the housing (16) via at least one face end (50), and a separate toothed element (32) for transmitting torque to a gear component (38, 40) (specification, page 4, lines 9-15, lines 22-24; Fig. 1; page 4,

lines 15-19; Fig. 1). The toothed element (32) is secured to the rotor shaft (18) and has an axial bearing face (48), which rests on the at least one face end (50) of the rotor shaft (18) (page 4, lines 26-34; Fig. 1). The toothed element (32) further has a bore (44), and the rotor shaft is connected to the bore (44) of the toothed element (32) via a press-fit connection that extends over only a portion of a length of the bore (44) (page 5, lines 9-23; Fig. 1). A bottom face (46) is disposed on a lower end of the bore (44), the bottom face (46) being oriented transverse to an axis of the rotor shaft (18) (page 4, lines 24-29; page 5, line 31 through page 6, line 1).

Independent claim 12 defines a gear drive unit (10) for adjusting moving parts in the motor vehicle, comprising a rotor shaft (18), which is supported in a housing (16) and is braced axially on the housing (16) via at least one face end (50) and a separate toothed element (32) formed as a worm gear (34) for transmitting torque to a gear component (38, 40) (specification, page 4, lines 9-15, lines 22-24; Fig. 1; page 4, lines 15-19; Fig. 1). The toothed element (32) is secured to the rotor shaft (18) and has an axial bearing face (48), which rests on one of the face ends (50) of the rotor shaft (18) (page 4, lines 26-34; Fig. 1). A through opening (52) is integrally formed onto the bottom face (46) of the bore (44) and receives a ball (56) that has the bracing face (60) (page 4, lines 27-34; Fig. 1). The through opening (52) is configured to receive the ball (56) such that the ball (56) is axially accommodated over half of its diameter in the through opening (52) (page 4, lines 27-34; Fig. 1).

Independent claim 13 defines a gear drive unit (10) for adjusting moving parts in the motor vehicle, comprising a rotor shaft (18), which is supported in a housing (16) and is braced axially on the housing (16) via at least one face end (50), and a separate toothed element (32) for transmitting torque to a gear component (38, 40) (specification, page 4, lines 9-15, lines 22-24; Fig. 1; page 4, lines 15-19; Fig. 1). The toothed element (32) is secured to the rotor shaft (18) and has an axial bearing face (48), which rests on one of the face ends (50) of the rotor shaft (18) (page 4, lines 26-34; Fig. 1). The rotor shaft (18) is connected to the toothed element (32) in a region (78, 96) having the radial bump (74, 73) via a press fit, and in a region (84) without radial bumps, the rotor shaft (18) is connected to the toothed element (32) via a clearance fit (page 6, lines 3-13; Fig. 1). A corresponding installation force is required only for the region (78) having the radial bump to press in the radial bumps (page 6, lines 16-19; Fig. 1).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. Whether claims 1, 2, and 10 are unpatentable under 35 U.S.C. 103(a) over U.S. Patent No. 2,987,349 to Kretzmer Jr. ("Kretzmer") in view of U.S. Patent No. 4,652,781 to Andrei-Alexandru ("Andrei-Alexandru"), and further in view JP 07015913 to Torii ("Torii").;

2. Whether claims 4 and 5 are unpatentable under 35 U.S.C. 103(a) over Kretzmer in view of Andrei-Alexandru and Torii, and further in view of U.S. Pub. No. 2003/0048969 to Hunter et al ("Hunter");

3. Whether claims 6-9 and 13 are unpatentable under 35 U.S.C. 103(a) Kretzmer in view of Andrei-Alexandru, and Torii in view of Hunter and further in view of U.S. Patent No. 6,486,577 to Ursel et al ("Ursel");

4. Whether claim 11 is unpatentable under 35 U.S.C. 103(a) over Kretzmer in view of Torii and further in view of JP 53-150356 ("JP '356"); and

5. Whether claim 12 is unpatentable under 35 U.S.C. 103(a) over Kretzmer in view of Torii in view of U .S. Patent No. 405,559 to Johansson ("Johansson").

VII. ARGUMENT

In the Advisory Action, the Examiner maintains that the claims as amended in the Request for Reconsideration did not place the application in condition for allowance because "the art is analogous in that each reference discloses axial bearings. One of skill in the art would be motivated to combine the references as taught by the references".

The Appellant respectfully disagrees for the reasons set forth below.

1. Claims 1, 2, and 10 are not obvious over the combination of Kretzmer, Andrei-Alexandru, and Torii.

The primary reference to Kretzmer discloses a worm 20 which is disposed on the rotor shaft 15 and supported on a start-up element 24 via a bottom surface 23. The front face of the rotor shaft 15 in Kretzmer is NOT braced on the bottom surface of the worm. Likewise, the axial pressing force is not able to be adjusted in advance (i.e., as "predeterminable pressing force"), since the convex stud 24 is not formed to be adjustable.

Furthermore, while Kretzmer may disclose a worm gear with a bore, this reference teaches away from a through hole in the bottom of the bore of the worm gear. There is no suggestion of placing a ball in such a through hole.

The Appellant submits that there is no motivation for the practitioner to combine Kretzmer with Andrei-Alexandru and Torii.

The reference to Torii teaches away from the subject matter of claims 1 and 5, since this reference specifically discloses that here the bore ("engaging recess 34") is "within the range D of the middle bearing 32 of the speed reduction shaft, being different from the range of a worm 32". This means that here the area of the meshing is to be supported by an additional bearing and the structure of the worm is not to be impaired by a bore. Thus, ***Torii clearly teaches away from forming a through bore on the bottom surface of a toothed element***.

Likewise, Andrei-Alexandru could not be combined with Kretzmer and Torii. While in this reference a sleeve 56 with a ball 58, it is separate from the gear element (worm 15) and separated by an additional bearing 48. Thus, the practitioner also receives from this reference only the suggestion to form a cup-shaped support element for axial damping of the armature shaft in addition to a cylindrical-casing like drive element (worm 15). Andrei-Alexandru therefore cannot be combined with Kretzmer.

2. Claims 4 and 5 are not obvious over the combination of Kretzmer in view of Andrei-Alexandru and Torii, and further in view of Hunter.

While Hunter describes a "bearing arrangement", however "in the field of precision bearings for example for measurement apparatus having articulated wrist parts" (see Hunter, column 1, paragraph [0001]). These types of precision measuring devices have absolutely nothing to do with a motorized gear-drive unit of Kretzmer. If a practitioner were to combine these two references, which would

have to be in a manner constituting impermissible hindsight, he would receive no teaching to form a through bore on a bottom surface of the sleeve-like worm 20 of Kretzmer. Since in Kretzmer, a curved molding 23 is already formed on the worm 20, the practitioner would receive no suggestion to replace this by a ball. Hunter, in contrast, shows an axial bearing by means of a ball movement, but does not disclose that on the bottom surface of a bore of a toothed element, a through opening/bore is formed. Therefore, the practitioner also receives no suggestion to insert a ball in such a through bore/opening.

The precise measurement apparatus for use on a coordinate measuring machine (CMM) like that in Hunter is markedly different the gear drive unit of the present invention. The practitioner skilled in the art would never look in the area of measurement tools, which utilize very small forces and very high end precision, to improve an electric drive unit. Further, there is not suggestion to provide a toothed element for transmitting torque and no suggestion for a through opening at the bottom of a bore in a worm gear. For example, Fig. 5 shows a ball at the end of a spindle – not the worm gear – whereby the ball has a through hole which is put on an extension 19 to combine the ball with the spindle and a housing part (see paragraph [0056]). In the same manner, Fig. 10 teaches away from the present invention, because the recess 92 is formed into the bearing assembly parts 28, 29 of the housing as special plastic inserts 85, but NOT into the spindle or the worm gear of the present invention.

The present invention, with the ball in the through opening, has a distinct advantage in that the ball can be mounted in the worm gear to put the whole

armature into the housing. It therefore is not necessary to mount the ball in a special bearing part of the housing and the ball could be mounted rotatably into the worm gear in a manner that the end of the rotor shaft can be supported directly against the bottom plane of the bore in the worm gear without producing an air bumper.

3. Claims 6-9 and 13 are not obvious over the combination of Kretzmer, Andrei-Alexandru, and Torii in view of Hunter and Ursel.

Regarding claim 7, the Examiner maintains in the final Office Action that Ursel renders obvious the feature that the inner diameter of the worm in the area of the "bottom face 46" is less than the axial open side of the worm. He argues that the knurling formed on the armature shaft is formed to correspond to the sleeve-shaped worm. The Appellant disagrees.

According to Ursel, the cylindrical worm 26 must be displaced over this entire length over the end 28 of the armature shaft. This means that the inner diameter of the cylindrical worm cannot be less than the outer diameter of the armature shaft on its radial end 28. If it were argued that the knurling on the armature shaft were deformed to the inner diameter of the worm 26, this inner diameter, however, is deformed in the same manner over the entire axial length of the cylindrical worm. Thus, the argument that the inner diameter of the worm 26 in the area of the knurling is less than in the remaining area is completely erroneous.

According to the present invention, in contrast, the embodiment of claim 7 defines that in the axial region (78) of the radial bump (74) of the rotor shaft (18) at the end next to the bottom face (46), the bore (44) has a lesser inside diameter (86) than in regions (84) of the rotor shaft (18) that are without radial bumps. With this structure of the worm sleeve, the armature shat must not be completely displaced through the worm sleeve, whereby a first a press-fit and material deformation must occur as soon as the sleeve with the smaller inner diameter area is displaced over the knurling.

Regarding claim 9, the same argument applies to this claim, which defines that the rotor shaft (18) is connected to the toothed element (32) in a region (78, 96) having the radial bump (74, 73) via a press fit, and in a region (84) without radial bumps, the rotor shaft (18) is connected to the toothed element (32) via a clearance fit. This limitation is defined by the term "through-ground", which clarifies that a press fit in the area of this knurling can only occur when the inner diameter of the worm sleeve has a smaller inner diameter before its mounting on the armature shaft in a specific area. These features appear not to have been considered by the Examiner.

The same arguments as set forth above also apply to claim 13.

4. Claim 11 is not obvious over the combination of Kretzmer in view of Torii and further in view of JP '356.

Regarding claim 11, as argued above, Torii specifically teaches away from the embodiment of Kretzmer, so that these references would not be combined and even if combined, could not lead to the subject matter of claim 11.

5. Claim 12 is not obvious over the combination of Kretzmer and Torii in view of Johansson.

With regard to claim 12, the same arguments made with regard to claim 5 and the teachings of Kretzmer and Torii apply here. In addition, Johansson is cited to show a through bore for receiving a ball. The Appellant disagrees.

Johansson shows a radial mounting A and a radial bearing E, H, I of a shaft B. This embodiment, however, is in no way able to be combined with a sleeve-like worm, which is disposed on an armature shaft. The shaft B of Johansson is supported directly in its end surface via the ball H and not, as in the present invention, on a bottom surface of a cup-shaped worm sleeve. Thus, the bore in the axial bearing element ("cup C") is so large that the shaft B can be inserted with their entire diameter through this bore. Thus, the "cup C" only represents a holding element for the ball H, but with its large bore for the shaft B, teaches away from the structure of a cup-shaped worm sleeve, on whose bottom surface a through bore with a smaller diameter is formed, such that the armature shaft with its end can be supported on the bottom surface of the worm sleeve.

Therefore, the Appellant submits that Johansson also could not be combined with the other references discussed above.

It is respectfully submitted that since the prior art does not suggest the desirability of the claimed invention, such art cannot establish a prima facie case of obviousness as clearly set forth in MPEP section 2143.01. Please note also that the modification proposed by the Examiner would change the principle of operation of the prior art, so that also for this reason the references are not sufficient to render the claims prima facie obvious (see the last paragraph of the aforementioned MPEP section 2143.01).

When prior art references require selective combination to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gleaned from the invention itself. ***ACS Hosp Sys., Inc., v. Montefiore Hosp.***, 221 USPQ 929, 932, 933 (Fed. Cir. 1984). When establishing obviousness under Section 103, it is not pertinent whether the prior art device possess the functional characteristics of the claimed invention, if the reference does not describe or suggest its structure. ***In re Mills***, 16 USPQ 2d 1430, 1432-33 (Fed. Cir. 1990).

In view of the foregoing discussion, it is respectfully requested that the Honorable Board of Patent Appeals and Interferences overrule the final rejection of claims 1-2 and 4-13 over the cited art, and hold that Appellant's claims be allowable over such art.

Respectfully Submitted,

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VIII. CLAIMS APPENDIX

Copy of Claims Involved in the Appeal:

1. A gear drive unit (10) for adjusting moving parts in a motor vehicle, comprising:

a rotor shaft (18), which is supported in a housing (16) and is braced axially on the housing (16) via at least one face end (50); and

a separate toothed element (32) for transmitting torque to a gear component (38, 40), wherein said toothed element (32) has a worm gear (34) and is secured to the rotor shaft (18), wherein the toothed element (32) has an axial bearing face (48), which rests on the at least one face end (50) of the rotor shaft (18), wherein the toothed element (32) further has an axial bracing face (60), wherein said toothed element is braced on an adjusting element (64) on the housing (16), wherein said adjusting element (64) has a form lock (72) that is configured to be engaged from the inside of said adjusting element by a selected installation tool, wherein said adjusting element (64) presses with a predeterminable pressing force against the axial bracing face (60).

2. The gear drive unit (10) as defined by claim 1, wherein the axial bearing face (48) is located on a bottom face (46) of a bore (44) in the toothed element (32).

4. The gear drive unit (10) as defined by claim 1, wherein the axial bracing face (60) has a radius (59) and is embodied as a spherical surface (58).

5. The gear drive unit (10) as defined by claim 2, wherein a through opening (52) is integrally formed onto the bottom face (46) of the bore (44) and receives a ball (56) that has the bracing face (60).

6. The gear drive unit (10) as defined by claim 5, wherein the rotor shaft (18) has a radial bump (74) in the form of a knurling (75) or a serration (76) in an axial portion (78), wherein said radial bump, upon introduction into the bore (44) of the toothed element (32), forms a force- and/or form-locking connection that is fixed against relative rotation.

7. The gear drive unit (10) as defined by claim 5, wherein in the axial region (78) of the radial bump (74) of the rotor shaft (18) at the end next to the bottom face (46), the bore (44) has a lesser inside diameter (86) than in regions (84) of the rotor shaft (18) that are without radial bumps.

8. The gear drive unit (10) as defined by claim 6, wherein the rotor shaft (18), after an integral forming on of the radial bump (74), is through-ground, and is axially mountable through a bearing sleeve (28) in the housing (16).

9. The gear drive unit (10) as defined by claim 6, wherein the rotor shaft (18) is connected to the toothed element (32) in a region (78, 96) having the radial bump (74, 73) via a press fit, and in a region (84) without radial bumps, the rotor shaft (18) is connected to the toothed element (32) via a clearance fit.

11. A gear drive unit (10) for adjusting moving parts in the motor vehicle, comprising:

a rotor shaft (18), which is supported in a housing (16) and is braced axially on the housing (16) via at least one face end (50); and

a separate toothed element (32) for transmitting torque to a gear component (38, 40), wherein said toothed element (32) is secured to the rotor shaft (18), wherein the toothed element (32) has an axial bearing face (48), which rests on the at least one face end (50) of the rotor shaft (18), wherein the toothed element (32) has a bore (44), wherein said rotor shaft is connected to said bore (44) of said toothed element (32) via a press-fit connection, wherein said press-fit connection extends over only a portion of a length of the bore (44), wherein a bottom face (46) is disposed on a lower end of the bore (44), wherein the bottom face (46) is oriented transverse to an axis of the rotor shaft (18).

12. A gear drive unit (10) for adjusting moving parts in the motor vehicle, comprising:

a rotor shaft (18), which is supported in a housing (16) and is braced axially on the housing (16) via at least one face end (50); and

a separate toothed element (32) formed as a worm gear (34) for transmitting torque to a gear component (38, 40), wherein said toothed element (32) is secured to the rotor shaft (18), wherein the toothed element (32) has an axial bearing face (48), which rests on one of the face ends (50) of the rotor shaft (18), wherein a through opening (52) is integrally formed onto the bottom face (46) of the bore (44) and receives a ball (56) that has the bracing face (60), wherein said through opening (52) is configured to receive said ball (56) such that said ball (56) is axially accommodated over half of its diameter in said through opening (52).

13. A gear drive unit (10) for adjusting moving parts in the motor vehicle, comprising:

a rotor shaft (18), which is supported in a housing (16) and is braced axially on the housing (16) via at least one face end (50); and

a separate toothed element (32) for transmitting torque to a gear component (38, 40), wherein said toothed element (32) is secured to the rotor shaft (18), wherein the toothed element (32) has an axial bearing face (48), which rests on one of the face ends (50) of the rotor shaft (18), wherein the rotor shaft (18) is connected to the toothed element (32) in a region (78, 96) having the radial bump (74, 73) via a press fit, and in a region (84) without radial bumps, the rotor shaft (18) is connected to the toothed element (32) via a clearance fit, wherein a corresponding installation force is required only for the region (78) having the radial bump to press in the radial bumps.

IX. EVIDENCE APPENDIX.

None.

X. RELATED PROCEEDINGS APPENDIX.

None.